

# Freeform Search

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<b>Database:</b>	<div style="border: 1px solid black; padding: 2px;">         US Pre-Grant Publication Full-Text Database          US Patents Full-Text Database          US OCR Full-Text Database          EPO Abstracts Database          JPO Abstracts Database          Derwent World Patents Index          IBM Technical Disclosure Bulletins       </div>
<b>Term:</b>	<div style="border: 1px solid black; height: 30px; width: 500px;"></div>
<b>Display:</b>	<div style="border: 1px solid black; width: 40px; text-align: center;">10</div> Documents in <b>Display Format:</b> <div style="border: 1px solid black; width: 40px; text-align: center;">-</div> Starting with Number <div style="border: 1px solid black; width: 40px; text-align: center;">1</div>
<b>Generate:</b>	<input type="radio"/> Hit List <input checked="" type="radio"/> Hit Count <input type="radio"/> Side by Side <input type="radio"/> Image

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Search

Clear

Interrupt

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## Search History

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**DATE:** Thursday, November 03, 2005    [Printable Copy](#)    [Create Case](#)

### Set Name Query

side by side

### Hit Count Set Name

result set

*DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=OR*

<u>L19</u>	L18 and (card with payment or card near payment or card adj payment)	188	<u>L19</u>
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<u>L18</u>	currency adj conversion	861	<u>L18</u>
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<u>L17</u>	(currency near2 conversion or money near2 conversion)	1213	<u>L17</u>
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*DB=USPT; PLUR=YES; OP=OR*

<u>L16</u>	'4877950'.pn.	1	<u>L16</u>
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<u>L15</u>	'4906828'.pn.	1	<u>L15</u>
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<u>L14</u>	'4935962'.pn.	1	<u>L14</u>
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<u>L13</u>	'4906828'.pn.	1	<u>L13</u>
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<u>L12</u>	'5420405'.pn.	1	<u>L12</u>
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<u>L11</u>	'5420405'.pn.	1	<u>L11</u>
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<u>L10</u>	'5546523'.pn.	1	<u>L10</u>
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<u>L9</u>	'5546523'.pn.	1	<u>L9</u>
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*DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=OR*

<u>L8</u>	5661517.pn.	2	<u>L8</u>
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<u>L7</u>	5678010.pn.	2	<u>L7</u>
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<u>L6</u>	5671285.pn.	2	<u>L6</u>
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<u>L5</u>	5448047.pn.	2	<u>L5</u>
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<u>L4</u>	5416306.pn.	2	<u>L4</u>
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<u>L3</u>	5287268.pn.	2	<u>L3</u>
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L2 5778067.pn.

2 L2

L1 5937396.pn.

2 L1

END OF SEARCH HISTORY

Faculty of Economics, Thammasat University, 2 Prachan Road, Bangkok, 10200, Thailand; email: pati@ipied.tu.ac.th.

THIS IS THE FULL-TEXT. Copyright Association for Computing Machinery 1996  
? b 233

```
>>>      233 does not exist
>>>1 of the specified files is not available
>>>No valid files specified
? b 9,20,476,610,613,624,634,636,810,813
      01nov05 17:59:10 User259908 Session D50.2
          $1.92      0.355 DialUnits File15
          $3.40      1 Type(s) in Format 9
          $3.40      1 Types
      $5.32 Estimated cost File15
      $1.86 TELNET
      $7.18 Estimated cost this search
      $7.65 Estimated total session cost      0.467 DialUnits
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SYSTEM:OS - DIALOG OneSearch

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File 9:Business & Industry(R) Jul/1994-2005/Oct 31
(c) 2005 The Gale Group
File 20:Dialog Global Reporter 1997-2005/Nov 01
(c) 2005 Dialog
File 476:Financial Times Fulltext 1982-2005/Oct 31
(c) 2005 Financial Times Ltd
File 610:Business Wire 1999-2005/Nov 01
(c) 2005 Business Wire.
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**\*File 610: File 610 now contains data from 3/99 forward.**

Archive data (1986-2/99) is available in File 810.

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File 613:PR Newswire 1999-2005/Nov 01
(c) 2005 PR Newswire Association Inc
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**\*File 613: File 613 now contains data from 5/99 forward.**

Archive data (1987-4/99) is available in File 813.

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File 624:McGraw-Hill Publications 1985-2005/Nov 01
(c) 2005 McGraw-Hill Co. Inc
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**\*File 624: Homeland Security & Defense and 9 Platt energy journals added**

Please see HELP NEWS624 for more

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File 634:San Jose Mercury Jun 1985-2005/Oct 31
(c) 2005 San Jose Mercury News
File 636:Gale Group Newsletter DB(TM) 1987-2005/Oct 31
(c) 2005 The Gale Group
File 810:Business Wire 1986-1999/Feb 28
(c) 1999 Business Wire
File 813:PR Newswire 1987-1999/Apr 30
(c) 1999 PR Newswire Association Inc
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Set	Items	Description
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? s	(cybercash or	digicash or ecash or cybercoin or mine (w) pay)
	5895	CYBERCASH
	615	DIGICASH
	722	ECASH
	382	CYBERCOIN
	455680	MINE
	3775630	PAY
	14	MINE(W) PAY
S1	6823	(CYBERCASH OR DIGICASH OR ECASH OR CYBERCOIN OR MINE (W) PAY)

NEW FILES RELEASED

\*\*\*Inspec (File 202)  
\*\*\*Physical Education Index (File 138)  
\*\*\*Computer and Information Systems Abstracts (File 56)  
\*\*\*Electronics and Communications Abstracts (File 57)  
\*\*\*Solid State and Superconductivity Abstracts (File 68)  
\*\*\*ANTE: Abstracts in New Technologies (File 60)  
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RELOADS COMPLETED

\*\*\* The 2005 reload of the CLAIMS files (Files 340, 341, 942)  
is now available online.

RESUMED UPDATING

\*\*\*ERIC (File 1)

\*\*\*

Chemical Structure Searching now available in Prous Science Drug  
Data Report (F452), Prous Science Drugs of the Future (F453),  
IMS R&D Focus (F445/955), Pharmaprojects (F128/928), Beilstein  
Facts (F390), and Derwent Chemistry Resource (F355).

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>>> Enter BEGIN HOMEBASE for Dialog Announcements <<<  
>>> of new databases, price changes, etc. <<<

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FTEXT1 is set ON as an alias for 15,16,148,160,275,621  
FTEXT2 is set ON as an alias for 9,20,476,610,613,624,634,636,810,813  
>>>Invalid SET option: NTEXT  
\* \* \*

File 1:ERIC 1966-2005/Sep 30  
(c) format only 2005 Dialog  
\*File 1: The database is now current with Monthly Updates.

Set	Items	Description
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Cost is in DialUnits

?

Terminal set to DLINK

? b 15

01nov05 17:52:50	User259908	Session D50.1
\$0.39	0.112	DialUnits File1
\$0.39		Estimated cost File1
\$0.08		TELNET
\$0.47		Estimated cost this search
\$0.47		Estimated total session cost 0.112 DialUnits

File 15:ABI/Inform(R) 1971-2005/Nov 01  
(c) 2005 ProQuest Info&Learning

Set	Items	Description
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? t 01223260/full

01223260/9

DIALOG(R)File 15:ABI/Inform(R)  
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01223260 98-72655

Money in electronic commerce: Digital cash, electronic fund transfer, and

**Ecash**

Panurach, Patiwat

Communications of the ACM v39n6 PP: 45-50 Jun 1996 ISSN: 0001-0782

JRNL CODE: ACM

DOC TYPE: Journal article LANGUAGE: English LENGTH: 6 Pages

SPECIAL FEATURE: Equations References

WORD COUNT: 4172

GEOGRAPHIC NAMES: US

DESCRIPTORS: Internet; Electronic commerce; Payment systems; Technological change; EFTS

CLASSIFICATION CODES: 9190 (CN=United States); 8100 (CN=Financial services industry); 5250 (CN=Telecommunications systems)

ABSTRACT: The growth of international interconnected computer networks and the pervasive trend in commerce of using these networks as a new field for business operations is stimulating demand for new payment methods. These new methods must attain unprecedented levels of security, speed, privacy, decentralization, and internationalization for digital commerce to be accepted by both consumers and businesses. Three such electronic payment methods are examined: 1. the generic, widely used electronic fund transfer, 2. the proposals for a digital cash standard, and 3. the real-world technology called Ecash. These methods are examined in terms of the dynamics of transaction clearance; the effects on money supply and the macroeconomy; their classification in terms of money and cash; and the comparative viewpoints of monetary authorities, financial institutions, and consumers.

TEXT: Headnote: Driven by inherent weaknesses in traditional paper-based payment methods, networked companies and their customers around the world now have at least three pervasive electronic options to move

Headnote: the numbers between their online accounts.

THE extraordinary growth of international interconnected computer networks and the pervasive trend in commerce of using these networks as a new field for business operations is stimulating demand for new payment methods. These new methods must attain unprecedented levels of security, speed, privacy, decentralization, and internationalization for digital commerce to be accepted by both consumers and businesses. This article analyzes three such electronic payment methods:

\*The generic, widely used electronic fund transfer

\*The proposals for a digital cash standard

\*The real-world technology called Ecash

These methods are examined in terms of the dynamics of transaction clearance; the effects on money supply and the macroeconomy; their classification in terms of money and cash; and the comparative viewpoints of monetary authorities, financial institutions, and consumers. This article does not go into detail on the myriad encryption systems, protocols, algorithms, and other technical matters concerning the new systems. These are all secondary aspects of electronic payment. Electronic payment systems are simply logical evolutionary steps that began with recognition of the limits of bartering. The need to pay for transactions is the root of all electronic payment systems.

Electronic Fund Transfer

THE electronic checking system for electronic payments has been in use since the late 1960s. For many consumer end users, electronic checking and electronic payment are the same thing, although the assertion does not apply in all cases. Electronic checking uses the existing banking structure to its fullest potential by eliminating paper checks. Electronic fund transfer and electronic checking are synonymous. Electronic fund transfer is an extremely varied system. Examples include: \*Paying university fees through the banking automatic teller machine (ATM) network,

\*Paying telephone bills through monthly bank account deductions, and

\*Large-value ( ranging from thousands to millions of dollars) interbank overseas fund transfers. Conceptually, electronic checking, and almost all

electronic payments, involves three agents-the buyer, the seller, and the intermediary. The buyer initiates a transaction with the seller, and the seller demands payment. The buyer then obtains a unique certification of payment (the virtual equivalent of a check) from the intermediary. This certification (in electronic form) debits the buyer's account with the intermediary. The buyer then gives the certification to the seller and the seller gives the certification to the intermediary. The certification credits the seller's account with the intermediary. Schematically, the transaction is like a conventional checking transaction. But when conducted electronically, the certification is an electronic flow documented by the intermediary. Most important, delivery of the certification, transfer of the certification, and debiting and crediting of the accounts occur almost instantaneously. If the buyer and seller don't use the same intermediary, some standardized clearinghouse system between intermediaries is used, usually coordinated by the country's central bank (for domestic transactions) or by a third country (for international transactions and when the third country's central bank is a trusted authority).

Since electronic checking is essentially checking, it can be analyzed as if it were conventional checking. Payments made via electronic checking would be conducted without cash and paper. Instead of sending a check or paying at a counter, the buyer would initiate an electronic checking certification via computer or point-of-sale terminal. If such a transaction is done as a substitute for paying cash, electronic checking could substantially reduce the transaction's demand for money. Instead of carrying wads of cash, consumers could initiate an electronic fund transfer at precisely the moment of the purchase. In essence, such a payment system is not electronic checking but electronic cash. But if electronic checking becomes a substitute for conventional checking, the speed of the transaction would increase. From an economic standpoint, there is no difference in the dynamics of the checking process between electronic and normal checks, aside from the transaction cost reductions in paper handling. Electronic checking provides a number of advantages over paper checks:

Saved time. The instantaneous updating of account balances allows all financial players more financial flexibility. There is no clearing period for transactions to be finished, allowing large cost reductions and more opportunities in cases of large-sum arbitration, while giving even normal consumers and savers a great deal of financial freedom. Time savings are also considerable. Checks no longer have to be cashed and purchased at bank branches.

Reduced costs for paper handling. Universities are not overwhelmed with paper checks at the beginning of each term; banks aren't faced with unmanageable lines of people every payday; governments don't need large

check printing and mailing facilities; fewer trees are cut.

No bounced checks. Being virtually simultaneous, receipt of the certification and debiting and crediting of accounts ensures that no certification is made without the funds to back it up. Such payments could be done through an automatic confirmation of account status before the certification is issued. This operation is similar to the verification of the credit limit before credit card transactions are finalized, except it can be done on the buyer's side.

Flexibility. Electronic fund transfer is an extremely broad and generic field, used, in various forms, worldwide. Transactions range from small-value retail-level withdrawals through ATM networks to international large-turnover networks, like the Clearing House Interbank Payments System (CHIPS), an international payments clearing system set up by some of the largest New York commercial banks, now consisting of a network of more than 115 depository institutions around the world. CHIPS handles an average of 182,000 transactions a day worldwide, valued at \$1.2 trillion.

Electronic checking bypasses the physical weaknesses of paper checks, although it is still, in essence, a check. A critical weakness of checks is privacy, since transactions must pass through the banking system. Moreover, the banking system is obligated to document the details of every transaction passing through it to comply with federal regulations governing documentation of electronic funds transactions, namely Regulation E, which implements the Electronic Funds Transfer Act of 1979 (15 U.S.C. 1693). But what is to prevent a bank from selling or leaking such information to third parties, like marketing researchers and governments, risking the possible loss of personal civil liberties? Such was the case of Winai La-onsuwan, formerly known as the Buddhist monk Yantra Amarobhikku, whose alleged illicit adventures in an Australian brothel were documented through American Express receipts [6]; such evidence was critical in his being defrocked. An even more frightening scenario would be if governments demanded access to or control over electronic checking transactions or electronic checking records. What would prevent governments from, say, compiling lists of people who bought blacklisted books or patronized blacklisted businesses? Electronic fund transfer systems could conceivably be a tool for Big Brother to gain control over individual lives. As payment systems using electronic checking become more pervasive, is it necessary to sacrifice the privacy and undocumentability associated with cash?

#### Digital Cash

Many groups and individuals feel that cash itself still has a role as an electronic payment system. But digital cash-the electronic equivalent of paper cash-would have to reflect the consumer's view of cash's essential characteristics:

Anonymity. The buyer would pay the seller. Nobody, except the seller, would know the identity of the buyer or the details of the transaction. In cases where the buyer was using a sufficiently sophisticated pseudonym system, not even the seller would know the identity of the buyer. Aside from the personal records of the two agents, there would be no record of the transaction's having taken place. The certification of payment would be the payment. There would be no immediate transfer between accounts that banks could analyze to discern the exact flow of funds.

Liquidity. Digital cash would have to be accepted by all concerned economic agents as a payment method. For example, in the global Internet, true digital cash would involve a significant proportion of Internet merchants' accepting digital cash for digital cash to be more than electronic play

money. In pilot projects, there must be a large threshold of affiliated merchants willing to accept digital payment for the system to succeed.

On the institutional side, digital cash has many advantages over existing fiat money (paper money and coins), mainly involving the physical weaknesses of fiat cash. First, cash is at high risk of robbery; it must be kept in secure vaults and be guarded by security guards. The more cash is held, the greater the risk and the greater the investment in security. Second, cash has high transport costs. Because physical mass is proportional to the amount of cash held, large amounts of cash are difficult and expensive to store and move. It has been estimated that the handling costs of transporting cash in the U.S. amount to more than \$60 billion a year [4]. Last, the advent of high-quality color copiers and counterfeiting methods make government stores of cash insecure. It is widely documented that counterfeit currency is used as a weapon of economic war, with the goal of destabilizing national economies and governments [6]. Digital cash can take many forms, including prepaid cards and purely electronic systems:

Prepaid cards. Buyers can buy prepaid cards that are accepted by special sellers. For example, self-contained phone cards (such as those used in Asia and Europe) act as surrogates for coins in paying for public phones. The weakness of phone cards as digital cash is liquidity; no one would accept a phone card for the payment of a meal. Electronic toll-road payment systems suffer the same weakness. Recent pilot projects conducted in Australia by Visa International show more promise. Prepaid and rechargeable cards are accepted at the point of sale of a variety of merchants. Furthermore, to increase the system's acceptability, Visa subsidizes the cost of point-of-sale terminals. It is now possible to pay for a beer at the bar and a hotel bill with the same card [4]. Incorporation of digital cash functions into multipurpose smart cards, announced by MasterCard, involves a card that conforms to the latest standard from the EMV (Europay, MasterCard, Visa) consortium and includes dynamic public-key authentication. Such multipurpose smart cards potentially allow many functions, such as subscriber identity modules (SIMs) for Global System for Mobile Communications (GSM) phones, ATM transactions, encryption/decryption, and digital cash.

Purely electronic systems. Purely electronic digital cash would be devoid of explicit physical form, making it useful for network and Internet transactions in which the buyer and the seller are in physically remote locations. The payment would take place through electronic deductions of digital cash from the buyer and its transmission to the seller. The actual transfer of digital cash is usually encrypted by either public-key or private-key encryption systems so that only the intended recipient (the seller) can actually use the cash. However, institutional constraints, like U.S. export restrictions on advanced encryption systems, might impede the acceptance and practicality of digital cash. Furthermore, methods of ensuring anonymity must be in place so that fully electronic systems are not turned into variants of electronic checking systems.

In its various forms, digital cash is not always cash. If, for example, a financial institution were to issue digital cash, the creation of digital cash could be considered a withdrawal from that financial institution. Similarly, the financial institution would be obliged to credit user accounts for deposits of digital cash. The digital cash would not need real funds to back it up, other than a legal reserve limit for the original deposits. Digital cash could be considered cash in calculations of the money supply. Therefore, when currency includes cash, coins, and digital cash: (Formula Omitted)

where MI is the money supply, LRR is the legal reserve limit on bank



lending, excess reserves are any nonobligatory reserves banks do not lend out, and MB is monetary base.

Withdrawing digital cash increases the ratios of currency/deposits and excess reserves/deposits, thus reducing the amount of deposits the financial institution has available for extending loans and reducing any dynamic effects on the expansion of the money supply.

If, on the other hand, a nonfinancial business were to issue digital cash, such issuance would simply be a purchase of one unit of digital cash with one unit of fiat cash. It could be backed up only by the willingness of merchants to accept digital cash as a unit of payment and not by any insurance (like the Federal Deposit Insurance Corp. [FDIC], the government agency that insures depositors' bank funds in the U.S.) or reserves. This nonbank type of digital cash is inherently riskier for the consumer than bank-issued digital cash. It is actually more like coupons than cash. Furthermore, redeeming fiat cash for non-bank-issued digital cash does not affect the monetary conditions of the economy. Buying digital cash does not affect the money-creation process; there is no decrease in the economy's capacity for loan creation and money supply creation.

Ecash

Now consider a real-world example of electronic payments. Ecash is an electronic payments system developed by the Digicash Co. of Amsterdam, The Netherlands, and is currently being implemented by the Mark Twain Bank of Missouri in the U.S. As of March 1996, another implementation of Ecash was initiated by the Merita Bank of Finland, but for the sake of consistency, only the Mark Twain Bank version is analyzed.

To undertake transactions, both buyer and seller have to have deposits in the Mark Twain Bank's WorldCurrency Access accounts. Access accounts are conventional checking accounts, insured by the FDIC but do not pay interest or have a fixed maturity period. Buyers must instruct the Mark Twain Bank to transfer funds from their WorldCurrency Access accounts into their accounts' Ecash Mint. Funds in the Mint are no longer deposits in the bank, and they are not insured. The Mint acts as a personal buffer account. At any time, buyers can order their computers to remotely interface with the Mint and withdraw funds from the Mint into the hard disk drives on their personal computers. The format of the funds is now completely electronic—a series of zeros and ones cryptographically secure and unique. It might be useful to consider the funds in the Mint and in the buyer's hard disk as being in an electronic wallet.

To make the payment, the buyer encrypts the appropriate amount of Ecash with a suitably secure encryption protocol and sends the Ecash to the seller. The Ecash can be sent to the seller by any data communications medium (e.g., email, ftp). Ironically, Ecash can even be saved onto a disk, printed onto paper, and the printed copy or disk sent to the seller. Sellers receive the Ecash and, after decrypting it, store it in their own computers. This can then be sent to the Mint and transferred into the seller's WorldCurrency Access account. The net result is a decrease in the buyer's funds and an increase in the seller's. Ecash is private. Although the Mark Twain Bank maintains records for each Ecash withdrawal and deposit (to comply with banking laws), it is impossible for the Bank to trace any subsequent uses of that Ecash. Lack of traceability is due to the fundamental specifications of the Ecash system, which is based on asymmetric public-key cryptography [2]. Specifically, it uses the RSA cryptographic system from RSA Data Security, Inc. with a key size of 768 bits. Such key size is not a maximum; it can be increased by the issuing bank. Besides being untraceable and anonymous, Ecash provides nonrepudiation; any disputes between a buyer and seller can be

unambiguously resolved. Nonrepudiation of transactions can also be a fundamental factor in the success and security of payment systems [1]. But although Ecash is purely electronic and is easily copied, it is impossible to use any Ecash twice because any Ecash must be verified with the Mark Twain Bank's database as never having been spent.

Given its nature, Ecash must be considered cash from the monetary standpoint. Ecash withdrawals from the user's account are leaks from the moneycreation process, just like cash withdrawals. If a user's WorldCurrency Access account had \$100 in it, and \$50 is withdrawn as Ecash, only \$50 (minus any legal reserve limit and excess reserves) could be lent out to other borrowers. Conversely, a \$50 Ecash deposit would give the Mark Twain Bank \$50 (again, minus legal reserve limit and excess reserves) to lend out.

### Monetary Implications

Now consider some tendencies in all types of electronic payment. First is the long-term trend to increase the velocity of money flow in the national economy. As the growth of the credit card industry (actually a subset of electronic fund transfer) shows, increased convenience of payment is a significant factor in increasing the number of payments made. As electronic payments become more widespread and increasingly available to the consumer, we might expect a similar long-term trend of increased price level for goods and services in the economy and for increased economic growth through increased velocity of transactions. Also, the disembodiment of cash tends to create illusions as to its value. Transforming money from bills in your wallet into charged electrons on your hard disk is probably a greater abstract leap than the transformation of gold coins to fiat currency. As another evolutionary step in the development of money, we might expect consumers to reexamine their conceptions of money, cash, and value. Another significant impact is revealed by research into the roots of interest-rate margins in the money market. For example, Citicorp, one of the largest banks in the world, has claimed that around 40% of the interest charged on a consumer finance loan represents branch delivery and management costs. Such costs could be reduced substantially with increased adoption of electronic means of payments. This implies that the interest differentials in the money market could be dramatically reduced with adoption of consumer electronic payments, spelling drastic changes for the structure of the banking industry.

### Standards, Competition, and Acceptance

Comparing these three electronic payment systems and their impacts, it should be noted that no single system is best. Which system is adopted depends largely on the details of the transaction and the needs of the people conducting the transaction. On the consumer side, survey data shows the single most important factor is wide acceptance of the system [7]. Thus, it may be that any system, whether formally standardized and secured or not, could gain market dominance and remain in that position by virtue of its being the ad hoc standard. Sellers would use it because most customers use it; customers would use it because most sellers use it. The main channel for competition among payment systems would be not in the cost of the system, but in gaining exclusive rights to the point of sale of a large number of merchants. This environment would make electronic payments widely available in a relatively short time but would not exactly be conducive to diversity or technologically innovative systems. This scenario would be analogous to the entrenched triopoly of Visa, MasterCard, and American Express in the credit card market.

An alternative to this situation might be the wide adoption of an open standard electronic payment system. If such a system were adopted, all intermediaries would jointly adopt an interoperable system, whereby the client of one system could transparently conduct transactions with any other seller whose intermediary uses the same system. Transparent transactions would be similar to the openness and competition in Thailand's ATM banking system, where the two ATM consortiums (ATM Pool and BankNet) support an open transactions system. The holder of a Bangkok Bank ATM card can withdraw money from, for example, a Thai Farmers Bank ATM. Such an open electronic payment system would have several advantages over a proprietary electronic payment system:

**Choice.** Users could be given greater choice among financial intermediaries and their services. Since there could be several intermediaries vying for the same open market, they would have to use a policy of differentiation. Such a structure would bring about a monopolistic competition type of market for open standard electronic payments. Hopefully, this differentiation would be to the benefit of the users.

**Policy.** Government policy implementation would be less ambiguous. Generally, the fewer heterogeneous systems there are to regulate, the more effective government policy would be on each system. Such relationships occur because each system would need a specific interpretation of the applicable laws. Since in most nations, the legislative process can't quickly enact new laws, the applicable laws tend to be arcane and controversial. Combined with the constrained capacity of the state, this lag might cause an ambiguous period of years before systems are finalized. The ambiguity during this period can kill off enthusiasm for new systems, leading confused consumers to adopt ad hoc methods or to return to conventional paper methods of payment. It could also lead to market distortions, as shortsighted governments could give anticompetitive concessions to single firms.

**Simplicity.** Open standard electronic payments systems would provide a consistent payment method from the user's side, where consistent interfaces are synonymous with system efficiency. Survey data [7] shows that simplicity is the second most important aspect in an electronic payments system. Thus, consistency in terms of transaction dynamics and interface of an open standard could contribute to the wide adoption of the open system.

Despite the advantages of open standard electronic payments systems, it is also likely that a variety of standards could simultaneously gain market acceptance. A heterogeneous market would not grow through conventional price competition but rather by seeking niches in the market. For example, it is highly likely that some form of electronic cash system will gain a market niche due to its unquestionable privacy. Besides the easily targetable markets of such socially deviant products as pornography, it would also gain acceptance from users uneasy with the fact that each of their transactions would be documented by the banking system. Fear of such information getting into the hands of bosses or governments would probably cause users to move to a more private system. An example of such concern for privacy is the case of the Clipper chip, where the perceived threat of U.S. government intrusion into personal communications is being publicly resisted.

Other niches might include government-subsidized systems for the payment of various state benefits. For example, an advanced virtual food stamp system has been implemented in New York City [8]. Grocery stores with a high proportion of food-stamp-using customers are required to install electronic payment systems at the point of sale. These customers can buy their

groceries without cash, allowing an automatic transfer of funds from their food stamp account to a grocery's account. This system reduces long lines at government offices, eliminates the black market in redeeming food stamps for cash, and significantly reduces the shuffling of paper by all parties. This system is used by 500,000 recipients and is reportedly favored over the old system by 94% of them.

## Conclusions

As for any new technology, it would be impractical to view the status of electronic payments as clearly defined. Ambiguities exist in both the technological and institutional realms. Technological constraints include the insecurity of some types of payment systems, especially in the area of anonymity. Institutional constraints include government regulations that may cripple the growth of electronic payment systems even before they take off. Also, reluctance of existing financial institutions to adopt new payment technologies due to lack of investment funds can be a considerable hurdle, especially in countries with underdeveloped financial institutions. Probably most crucial, however, is the role of consumer acceptance in catalyzing system adoption. Although the technology has existed for decades to implement many systems, they have just begun to permeate the lives of ordinary consumers. The number of merchants (as of Jan. 1 1996) accepting Ecash is less than 100, according to Digicash's own registries. Card-based electronic cash systems have been implemented only in pilot projects in a handful of cities around the world. Nevertheless, the trends of modern commerce, driven by the weaknesses of traditional payment systems, point to the eventual rise of electronic payments. Electronic payments might not completely replace traditional systems, but there is plenty of room to grow. 1

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## Author Affiliation: About the Author

PATIWAT PANURACH is a student in the Faculty of Economics at Thammasat University in Bangkok, Thailand. Author's Current Address: BE Program,

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? s consumers and merchants
    1871443 CONSUMERS
    193326  MERCHANTS
    S2 51553 CONSUMERS AND MERCHANTS
? s brokers
    S3 1558139 BROKERS
? s cybercash (w) settlement
    5895  CYBERCASH
    798701 SETTLEMENT
    S4 0 CYBERCASH (W) SETTLEMENT
? s settlement
    S5 798701 SETTLEMENT
? s cash (w) transactions
    3439215 CASH
    1080870 TRANSACTIONS
    S6 7638 CASH (W) TRANSACTIONS
? s s1 and s2 and s3 and s4 and s5 and s6
    6823  S1
    51553  S2
    1558139 S3
    0 S4
    798701 S5
    7638  S6
    S7 0 S1 AND S2 AND S3 AND S4 AND S5 AND S6
? s s1 and s2 and s3 and s6
    65047  SL
    51553  S2
    1558139 S3
    7638  S6
    S8 0 SL AND S2 AND S3 AND S6
? t s1 and s2 and s3 and s6
>>>'AND' not allowed in command
? s s1 and s2 and s6
    6823  S1
    51553  S2
    7638  S6
    S9 88 S1 AND S2 AND S6
? s s3 and s9
    1558139 S3
    88 S9
    S10 1 S3 AND S9
? t s10/full/1

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10/9/1 (Item 1 from file: 20)  
 DIALOG(R)File 20:Dialog Global Reporter  
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03511185 (THIS IS THE FULLTEXT)  
**IRT Business & Finance (Wired On Friday): Big Apple not ready to abandon cash, trial finds**  
 CAROL POWER  
 IRISH TIMES, p59  
 November 20, 1998  
 JOURNAL CODE: FIRT LANGUAGE: English RECORD TYPE: FULLTEXT  
 WORD COUNT: 986

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With so few using their smart cards, a third of the 600 **merchants** who originally signed up for the trial dropped out. About dollars 1 million ((pounds) 678,000) was spent using the cards - 30 per cent of that use was at smartcard readers on laundry machines in apartment buildings. Cardholders also chose to use the cards at grocery stores where credit and debit cards are already accepted.

The sponsors of the project concluded that several conditions were lacking for smart-card success in the US. 'These include further advances in inter-operability, expansion of venues into more geographies, and the emergence of unattended applications such as telephones, parking meters, and transit systems,' they said in a joint statement.

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'There's a great lesson in it,' he said, 'you must match the payment type to the application being sold.' **DigiCash**'s drawback, he said, was to concentrate on one payment type - credit cards. **CyberCash**, on the other hand, offers three forms of payment - cash (pay before), cheque (pay now) and the credit card (pay later).

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Copyright 1998 Irish Times. Source: World Reporter (Trade Mark) - FT McCarthy.

COMPANY NAMES: Chase Manhattan Corp

DESCRIPTORS: Corporate Finance; Company News

COUNTRY NAMES/CODES: United States of America (US)

REGIONS: Americas; North America; Pacific Rim

SIC CODES/DESCRIPTIONS: 6211 (Security **Brokers** & Dealers)

? show files

File 9:Business & Industry(R) Jul/1994-2005/Oct 31

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File 636:Gale Group Newsletter DB(TM) 1987-2005/Oct 31

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File 810:Business Wire 1986-1999/Feb 28

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File 813:PR Newswire 1987-1999/Apr 30

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? display sets

Set	Items	Description
S1	6823	(CYBERCASH OR DIGICASH OR ECASH OR CYBERCOIN OR MINE (W) P-AY)
S2	51553	CONSUMERS AND MERCHANTS
S3	1558139	BROKERS
S4	0	CYBERCASH (W) SETTLEMENT
S5	798701	SETTLEMENT
S6	7638	CASH (W) TRANSACTIONS
S7	0	S1 AND S2 AND S3 AND S4 AND S5 AND S6
S8	0	S1 AND S2 AND S3 AND S6
S9	88	S1 AND S2 AND S6
S10	1	S3 AND S9
? s s1 and s3 and s6		
	6823	S1
	1558139	S3
	7638	S6
S11	4	S1 AND S3 AND S6
? t s11/full/1-4		

11/9/1 (Item 1 from file: 9)  
DIALOG(R)File 9:Business & Industry(R)  
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01237903 Supplier Number: 23872513

**ETrade Adds CyberCash NewsStand**

**(ETrade Group signs deal with CyberCash that will provide ETrade customers with access to a database of current news and investment articles)**

Newsbytes News Network, p N/A

April 23, 1997

DOCUMENT TYPE: Journal (United States)

LANGUAGE: English RECORD TYPE: Fulltext

WORD COUNT: 321

TEXT:

PALO ALTO, CALIFORNIA, U.S.A., 1997 APR 23 (NB) -- By Richard Bowers.  
Online investing services provider ETrade Group (NASDAQ:EGRP) announced a deal with **CyberCash** (NASDAQ:CYCH) that will provide ETrade customers with access to a database of current news and investment articles. With the deal, ETrade adds **CyberCash** 's Digital NewsStand as a place where customers can buy financial information piecemeal. Last week ETrade added InvestTools, another service that supplies single newsletter articles for a charge. Now through **CyberCash** 's Digital NewsStand, publishers are able to offer individuals daily or limited- time views of content, without requiring full subscriptions to a particular publication or service. "ETrade investors will get instant online access to information for researching investments from sources that would not otherwise be available without a subscription," says Jeff Irby, **CyberCash** vice president of sales and marketing. ETrade customers will be able to download a personal **CyberCash** wallet from the ETrade Web site at <http://www.etrade.com> . The **CyberCash** Internet Wallet stores funds drawn from a customer's existing bank account or credit card for the exclusive purpose of purchasing items from the **CyberCash** digital NewsStand. The wallet can be used in conjunction with **CyberCoin** , **CyberCash** 's service that enables users to conduct small **cash transactions** online with the click of a mouse.



**CyberCoin** is designed for micropayments ranging from 25 cents to \$10. A spokesperson for ETrade told Newsbytes that eventually it plans to offer an entire range of financial information that investors can buy one article or report at a time. "Instead of having to buy a series of subscriptions to financial publications and newsletters, investors will be able to buy exactly what they want, being charged for each item at a low price," said ETrade spokesman Steve Lipson. Among the first publishers to post editions to the Digital NewsStand are Barron's Online, Financial Times of London, Bloomberg LP, and American Banker Online. (19970422/Press Contact: Brian Rolfe, **CyberCash**, 914-591-5599/Reported By Newsbytes News Network: <http://www.newsbytes.com>)

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COMPANY NAMES: **CYBERCASH** INC; E TRADE GROUP INC  
INDUSTRY NAMES: Financial services; Information industry; Online services; Securities  
PRODUCT NAMES: Security **brokers**, dealers, and flotation companies (621000); On-line service providers (737500)  
CONCEPT TERMS: All intellectual property; All product and service information; Distribution license; Product introduction  
GEOGRAPHIC NAMES: North America (NOAX); United States (USA)

11/9/2 (Item 1 from file: 20)  
DIALOG(R)File 20:Dialog Global Reporter  
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06336974 (THIS IS THE FULLTEXT)  
**The case for e-cash and \$60B in savings**  
NEVILLE NANKIVELL  
FINANCIAL POST, p09  
July 22, 1999  
JOURNAL CODE: FFP LANGUAGE: English RECORD TYPE: FULLTEXT  
WORD COUNT: 916

ENDING CASH: THE PUBLIC BENEFITS OF FEDERAL ELECTRONIC CURRENCY  
By David R. Warwick, Quorum Books, Westport, Conn., 213 pages, \$59.95  
(US)

Canadians have rapidly embraced the new world of electronic funds transfer. On a per capita basis, we're the world's heaviest bank machine users. We've taken to debit cards, direct deposits and pre-authorized bill payments with particular enthusiasm.

We have one of the world's fastest and most efficient electronic settlement and clearing systems for domestic payments. Pilot projects are under way on paying bus fares and the like electronically. Other smart-card uses are expanding here.

However, Canada, like other advanced economies, is still a long way from becoming the cashless society that some had imagined would be a reality by the next millennium. Cash payments in Canada and the United States still represent a big chunk of annual consumer expenditures -- an estimated 20% by value and 85% in terms of actual transactions. The volume of cash in circulation is still rising. More convenient access to bank machines has made tangible cash more readily available. In emerging market economies, such as in Latin America, wads of bills are still being plunked down for such big-ticket items as cars and even houses.

Yet as U.S. author David Warwick points out in his recently published book *Ending Cash*, the social and economic benefits of eliminating **cash**

**transactions** could be truly profound. A lawyer, investor and researcher based in Santa Rosa, Calif., Mr. Warwick argues the U.S. should lead the way by becoming the first nation to go to federal electronic currency -- or what he calls a FEDEC system.

What he envisions is a mostly debit-card type of national electronic system run by the Federal Reserve Board, the U.S. central bank. Every individual and enterprise would have a FEDEC account and their identities would be known. The system would not provide credit or pay interest. It would be linked and "interchange" with private-sector banking networks. Smart cards with stored units of value, bank cards, credit cards and Internet payments could still be part of the overall system, along with cheques, bank drafts, travellers' cheques and such. Foreign visitors would make payments this way. But actual tangible cash in the United States would be phased out over a span of years. Its form would be changed, but not the issuer -- the government. Existing central-bank monetary controls would be retained.

Mr. Warwick admits there would continue to be a reluctance to give up cash. Many people distrust government and financial institutions. But he makes the case that the result would be huge economic savings and positive outcomes such as eliminating cash-based crime -- which is often violent -- and tax evasion related to the cash-driven underground economy.

The cost and nuisance factor of handling and moving bills and coins would be ended. In the U.S., some estimates put this at \$60-billion (US) annually.

Trouble is, there are no signs of government or business pushing for a national electronic currency. There are also legitimate concerns over privacy and security and the potential for Orwellian government surveillance of the millions of individual and business accounts that would have to be registered with a national e-currency system. Nonetheless, Mr. Warwick believes a federal-government system "not only would warrant and receive high-level security but could be operated under principles recommended by privacy advocates."

His tracing of how electronic funds transfer networks have emerged proves the technology is feasible. Banks developed automated systems out of necessity. Personal chequing, which before the Second World War was mostly the preserve of the well-heeled, had exploded in the 1960s. But manual cheque processing was slow and costly. The Federal Reserve Bank in San Francisco set up the first electronic clearing system along with 10 other regional banks in the late 1960s.

Effective this year, all U.S. federal payments have to be made electronically. Some European countries have just about phased out cheques.

Canada's national automated payments network is regulated by the federal government but not run by it, although some have been advocating a greater state role.

The Liberal government intends to make sure the system is opened to wider membership -- allowing non-deposit takers such as life insurers, money market mutual funds and investment **brokers** to participate directly.

These reforms will take time to implement but should result eventually in new financial products that will help speed up the shift to a "less-cash" and chequeless society. Greater use of bank cards, smart cards and growth of Internet-based ' **cybercash** ' will increasingly replace use of conventional cash.

The issue as Mr. Warwick sees it is whether tomorrow's electronic cash will be issued by federal governments or by private-sector institutions. He plumps for government on the grounds of cost and efficiency. But there's no reason why the private sector can't get the job done effectively and meet privacy and security concerns.

It's already showed the way with a variety of innovative cash-displacement products. The private-sector Canadian Payments

Association is also getting involved in making Internet payments more secure. It will act as the certification authority in e-commerce transactions.

The role of government should be left to regulation -- to ensure the security and, within reason, the privacy of users of electronic transfer systems. Governments can also help by promoting the interlinking of these networks nationally and internationally. But they don't need to get directly involved in managing their operations or starting up new systems. Let cash disappear gradually as competitive market developments supplant it -- but not before then.

Copyright 1999 National Post. Source: World Reporter (Trade Mark) - FT McCarthy.

DESCRIPTORS: Economic News; Science & Technology; General News; Society & Social Affairs

COUNTRY NAMES/CODES: United States of America (US) ; Canada (CA)

REGIONS: Americas; North America; Pacific Rim

SIC CODES/DESCRIPTIONS: 6099 (Functions Related to Deposit Making); 7375 (Information Retrieval Services)

11/9/3 (Item 2 from file: 20)

DIALOG(R)File 20:Dialog Global Reporter

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03511185 (THIS IS THE FULLTEXT)

**IRT Business & Finance (Wired On Friday): Big Apple not ready to abandon cash, trial finds**

CAROL POWER

IRISH TIMES, p59

November 20, 1998

JOURNAL CODE: FIRT LANGUAGE: English RECORD TYPE: FULLTEXT

WORD COUNT: 986

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With so few using their smart cards, a third of the 600 merchants who originally signed up for the trial dropped out. About dollars 1 million ((pounds) 678,000) was spent using the cards - 30 per cent of that use was at smartcard readers on laundry machines in apartment buildings. Cardholders also chose to use the cards at grocery stores where credit and debit cards are already accepted.

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Copyright 1998 Irish Times. Source: World Reporter (Trade Mark) - FT McCarthy.

COMPANY NAMES: Chase Manhattan Corp  
DESCRIPTORS: Corporate Finance; Company News  
COUNTRY NAMES/CODES: United States of America (US)  
REGIONS: Americas; North America; Pacific Rim  
SIC CODES/DESCRIPTIONS: 6211 (Security **Brokers** & Dealers)

11/9/4 (Item 1 from file: 624)  
DIALOG(R)File 624:McGraw-Hill Publications  
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00948709

**UTILITIES USE INTERNET FOR BILLS, VENDOR PAYMENTS, POWER MARKETING**

Energy Services & Telecom Report (formerly DSR), Vol. 39, No. 25, Pg 10  
June 18, 1998

JOURNAL CODE: DSR

SECTION HEADING: Technology ISSN: 1286-4008/96

WORD COUNT: 697

**TEXT:**

Utilities are increasingly turning to the Internet and other electronic media for a variety of services, including bill paying, vendor payments and marketing.

Among companies recently announcing electronic services are Consolidated Edison, PP&L and DQE. In addition, the Edison Electric Institute is helping its members institute electronic bill paying.

At its recent convention, EEI announced a joint venture with **CyberCash** Inc. to make the company's system available to members at a discount. The **CyberCash** PayNow Secure Electronic Check Service allows utilities and other providers to receive payments from consumers over the Internet.

According to EEI, electric utilities collect almost \$200-billion annually, and automating payments can cut processing costs significantly. **CyberCash**, based in Reston, Va., also says that electronic billing 'reinforces the biller's franchise and brand.' This is possible because the consumer pays the supplier directly, on its web site, and not through a home banking service. The system can be used with credit cards, as well as debit and purchase cards. In addition, **CyberCash** can arrange **cash transactions** from bank accounts.

Consolidated Edison's Accounts Payable On-Line Internet service lets the company's vendors check the status of their invoices. Con Ed purchases \$4-billion in goods and services each year, and this system gives vendors

real-time information, 24 hours a day.

To use the system, vendors access the web site (<http://www.coned.com/accounts payable/>) and enter a payee code or a purchase order number. They can then check invoices to determine when Con Ed received them and whether or not payment has been processed. Menu options allow sorting by invoice number and let the vendor see payment check numbers. The site also contains shipping instructions, sales tax information and e-mail for questions.

Con Ed already offers Internet payments and pay-by-phone options for retail customers. The utility recently started its Direct Payment Plan, which allows customers to pay electric and gas bills from their checking accounts. Under this plan, Con Ed automatically deducts the bill amount from the customer's bank. Information on all of these services is available on Con Ed's web site (<http://www.coned.com/cus/main.htm>).

Elsewhere, PP&L Spectrum--an affiliate of the utility--has launched IntelliBill, which is aimed at businesses that operate multiple facilities. Aside from tracking electricity, this system coordinates bills for other utilities and services, including gas, fuel oil, telephone, water and sewerage. PP&L Spectrum verifies, totals and tracks all bills, and arranges electronic fund transfers to make monthly payments. It also provides ledger information and analysis of utility use.

Customers can view their data anytime, via a secured location on the Internet. They can see scanned images of bill statements, as well as reports on utility use and costs at individual facilities. This information can be downloaded to spreadsheet software.

On a different track, Duquesne Enterprises, an affiliate of the Pittsburgh-based utility, has invested in North American Power **Brokers**, which arranges anonymous power and gas trades over the Internet. The company did not disclose its stake, but North American Power, based in Maynard, Mass., said it is less than a controlling share.

With the World Wide Retail Energy Exchange (REX), purchasers place their requests on a secure Internet web site without revealing their identities. Suppliers review the buyer's consumption profile and make proposals, which are evaluated by North American Power. It chooses the winning bid and is compensated by the supplier on a fixed-fee or percentage basis.

John Gaus, president of North American Power, said marketers spend a great deal of time and money on sales, but close less than 10% of the deals they pursue. At the same time, they often disclose their trading floor positions to non-buyers.

Aside from buying a stake in the company, Duquesne has also licensed the system. Gaus said utilities can use REX to acquire supplies for their customers, and it is negotiating with a number of unnamed utilities to license the system.

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COMPANY NAMES: Consolidated Edison ; **CyberCash** Inc ; Duquesne Enterprises ; DQE ; Edison Electric Institute ; North American Power **Brokers** ; PP & L Spectrum ; REX ; World Wide Retail Energy Exchange ? display sets

Set	Items	Description
S1	6823	(CYBERCASH OR DIGICASH OR ECASH OR CYBERCOIN OR MINE (W) P-

AY)  
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S4 0 CYBERCASH (W) SETTLEMENT  
S5 798701 SETTLEMENT  
S6 7638 CASH (W) TRANSACTIONS  
S7 0 S1 AND S2 AND S3 AND S4 AND S5 AND S6  
S8 0 S1 AND S2 AND S3 AND S6  
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S10 1 S3 AND S9  
S11 4 S1 AND S3 AND S6  
?